REMARKS

Reconsideration of the Office Action of September 26, 2006 is respectfully requested. Enclosed herewith is a three month extension of time together with the requisite three month extension fee (large entity).

Applicant would like to thank Examiner Alejandro Mulero for the courtesies extended Applicants' representative during the interview conducted on March 23, 2006.

The discussion below describes the content of that interview in conjunction with the general remarks raised relative to the Office Action.

In the Office Action the claims were objected to and a request was made for a substitute specification due to the line spacing on the claims being considered to narrow. As the enclosed claim amendments present a full set of claims with sufficient line spacing, withdrawal of the substitute specification requirement is respectfully requested.

Applicants look forward to receipt of an initialed PTO-1449 relative to the January 26, 2006 Information Disclosure Statement filing. In addition enclosed is a PTO –1449 listing US Patents 6,488,807 and 6,068,784 which are the two patents noted by the Examiner after the interview summary record was generated just prior to interview departure. Initialing of these two references recently brought to attention by the Examiner during the interview is respectfully requested.

In the present Amendment, the withdrawn claims have been cancelled to facilitate the prosecution of the present case. In addition, claims 5 and 6 have been amended to more clearly describe the method of the present invention in accordance with the discussion in the interview and now include a description of the igniting of a plasma based on only the high frequency power from said mount to said grounded conducting member and a subsequent initiation of the inductive coupling. Also in accordance with the interview discussion, the structural reference to a "flat" conducting member has been removed from the main claims and some of the new dependent claims include reference to the method preferably involving a flat surfaced disc or the like. The new dependent claims also include a minor typographical correction in claim 11 as well as the introduction of a set of dependent claims that are similar to those depending from claim 5 but dependent upon claim 6. In addition, per the interview discussion the amended claims also recite the preferred process that has a non-electrically coupled conducting member. As all the claim revisions find either explicit or non-ambiguous

implicit or inherent disclosure support, the claim revisions are respectfully submitted to be free of new matter and in full accord of the first and second paragraphs of 35 USC 112.

As also described during the interview, the Office Action includes prior art rejections raised against the earlier elected method claims 5 to 11 as follows:

IDENTIFICATION/ CLAIM NOS.		*REFERENCE(S) & STATUTORY GROUNDS*
A	*5-8*	*Raaijmakers '689 in view of Forster et al. EP '873 and further in view of Qian et al '636 [obviousness under 103]*
B	*9*	*Same as A further in view of Brcka '711*
C	*10 and 11*	*Same as B further in view of Liu et al. '170*

As described in the present application, the subject matter of the present invention includes a plasma processing method that uses inductive coupled plasmas and is directed at avoiding the problems that arise in processing due to the slant electric fields generated immediately after plasmas have been ignited. An additional feature of preferred embodiments of the present invention includes a plasma processing method which is directed at igniting the plasmas without failure even with the use of a Faraday shield in the conductive coupled plasma system.

To facilitate a better appreciation of the differences between the prior art and the presently claims invention reference is first made to a preferred embodiment of the present invention for background purposes. The first embodiment is illustrated in Figure 2 and described as follows:

> *In the chamber 31, a susceptor (mount) 33 of a conducting material for horizontally supporting a wafer W, an object-to-be-processed is arranged, supported by a cylindrical support member 35. A conducting member 49 of a conducting material is disposed upper of the belljar 32, opposed to the*

> *susceptor 33.The conducting member 49 is formed of a metal of high conductivity,.... The conducting member 49 is disposed upper of the belljar 32, opposed to the susceptor 33....The conducting member 49 is grounded to GND to thereby generate electric fields vertical to the susceptor 33 between the conducting member 49 and the susceptor 33.The susceptor 33 is connected to a second high-frequency electric power source 34, and the second high-frequency electric power source 34 supplies high-frequency electric power to the susceptor 33 to generate electric fields vertical to the wafer W between the susceptor 33 and the conducting member 49...*

Additionally, as described on page 13 of the present application:

> *.....the Ar gas supply source 61 into the chamber 31 and the belljar 32 while high-frequency electric power is supplied from the second high-frequency electric power source 34 to the susceptor 33 to thereby generate, between the susceptor 33 and the conducting member 48, electric fields which are vertical to the wafer W. The Ar gas is excited by the electric fields to ignite plasmas..... After the plasma ignition, the supply of high-frequency electric power from the first high-frequency electric power source 43 to the coil 42 is started to generate induced electromagnetic fields in the belljar 32 while the supply of the high-frequency electric power from the second high-frequency electric power source 34 to the susceptor 33 is stopped. Hereafter the plasmas are retained by the induced electromagnetic fields. If necessary, the supply of the high-frequency electric power from the second high-frequency electric power source may be retained after the start of the supply of the high-frequency electric power from the first high-frequency electric power source 43.*

Further, in describing an alternate embodiment of the present invention which adds a Faraday shield and yet is still capable of efficient ignition of the plasma reference is made to Figure 4 and the corresponding disclosure bridging pages 15 and 16 of the present application which is repeated below for convenience:

> *The pre-cleaning apparatus 15' [of Fig. 4] has the same structure as the pre-cleaning apparatus 15 according to the first embodiment except that in the former the Faraday shield 44 is not provided. Such pre-cleaning apparatus 15' performs the processing operation for removing natural oxide films formed on a wafer W that, as is done in the pre-cleaning apparatus 15 according to the first embodiment, high-frequency electric power is supplied from the second high-frequency electric power source 34 to the susceptor 33 to ignite plasmas, and then high-frequency electric power is supplied from the first high-frequency electric power source 43 to the coil 42 to generate inductive coupled plasmas to remove the natural oxide films formed on the wafer W. In the present embodiment, when the plasmas are ignited, as described above, the high-frequency electric power is supplied from the second high-frequency electric power source 34 to the susceptor 33 prior to the supply of the high-frequency electric power source from the first high-frequency electric power source 43, so as to generate electric fields vertical to*

a wafer W between the susceptor 33 and the conducting member 49, whereby the state where the electric fields vertical to the wafer W are dominant can be created. Accordingly, the state where slant electric fields which tend to cause the deterioration of a surface state of a wafer W, and disadvantages of charge accumulation, etc. due to the slant electric fields are not generated, whereby the deterioration of a surface state of a wafer W and influences of charge accumulation, etc. can be reduced. After the plasmas have been thus ignited, the high-frequency electric power is supplied from the first high-frequency electric power source 43 to the coil 42, whereby the plasma processing can be performed with the inductive coupled plasmas highly efficiently and with little damage, as is done in the first embodiment.

With the (not intended to be limiting) background provided above, the discussion below is directed at how the claimed invention distinguishes over the relied upon prior art in the Office Action.

As noted by the Examiner in the Office Action, the base reference to *Raaijmakers '689* lacks a showing of a conducting member as featured in the present invention, a Faraday shield, a substrate heating device, and a sequenced power supply like that claimed in the present claims.

In an effort to remedy the deficiency of *Raaijmakers '689* concerning its lack of a conducting member like that of the present invention, reliance is placed on the embodiment of Forster. A review of the Forster reference reveals that is features a circuit as shown in Figure 5 wherein electrode 180 is positioned directly in line with the induction coil line and connected either across a capacitor to ground or via an induction coil return. As described in Forster the added, in-line electrode 180 is designed to work together with the inductive power associated with the antenna in the same line to achieve plasma ignition. There is also described (paragraph bridging col. 4 and 5) a conductive pedestal that includes conductive material and "may be either grounded (e.g.., during plasma ignition) or connected to a bias RF power source to control kinetic energy of the plasma ions near the wafer 130 during processing").

According, it is respectfully submitted that applying the teachings as a whole of each of the references would not satisfy the claimed method of using a system that involves igniting plasmas based on only HF electric power from the mount to the grounded conducting member and before the inductive coupling based plasma generation.

In the Office Action, reliance is placed on Qian in an effort to cover the claimed sequence of generating a vertical field plasma with a mount HF electric source with that

generated field being generated with respect to an above positioned electrode that is grounded, and then initiating inductive plasma generation thereafter. A review of Qian reveals that it, like Forster, fails to disclose or suggest this method. That is, Qian describes in col. 9, lines 16 plus the following:

> *The coupler 222 advantageously permits dynamic control of the relative amount of capacitive coupling and inductive coupling during substrate processing. For example, the voltage to the electrode 220 may be increased in the beginning of the process so that the energy is coupled primarily capacitively to facilitate plasma ignition. During processing, the voltage to the electrode 220 may be decreased so that the RF energy coupled to the plasma is both inductive and capacitive, or is primarily inductive. The voltage on the electrode 220 may be turned off so that during processing coupling from the source power is essential inductive only, while the bias power supply 106 supplies capacitively coupled bias power.*

Furthermore, Qian describes in Col. 10 lines 41 plus the following:

> *Plasma* ***ignition may be performed by applying RF power to the electrode 220 alone or applying RF power to both the electrode 220 and the antenna 102. If the bias power 106 is provided for biasing the wafer pedestal 107, the pedestal 107 can also be biased with RF power during plasma ignition.***

Accordingly, as the electrode is always powered during the plasma ignition based on the above description, the bias power 106 of Qian et al does not feature a process that involves igniting plasmas based on only HF electric power from the mount to a grounded conducting member and with induction coil plasma generation processing being carried out thereafter.

Stated in other words, none of the references of Raajmaker, Forster and Qian disclose or suggest a process that ignites plasma based on only the high frequency power from said mount to said grounded conducting member with a subsequent initiation of inductive plasma.

In view of the foregoing it is respectfully submitted that each of independent claims 5 and 6 stand in condition for allowance and thus also the dependent claims depending therefrom.

In view of the above remarks, Applicants submit that the rejections are overcome. Hence, reconsideration and withdrawal of the rejection are respectfully requested.

Also, Applicants respectfully submit that this Amendment and the above remarks obviate the outstanding rejections in this case, thereby placing the application in condition for immediate allowance. Allowance of this application is earnestly solicited.

If any fees are due in connection with the filing of this Amendment, such as fees under 37 C.F.R. §§1.16 or 1.17, please charge the fees to Deposit Account 02-4300; Order No. 033082.167

Respectfully submitted,

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